

A Review of the Genus *Polemistus* in the New World (Hymenoptera: Sphecidae)

ARNOLD S. MENKE AND DAVID L. VINCENT

(ASM) Systematic Entomology Laboratory, IIBIII, ARS, USDA, % U.S. National Museum, Washington, D.C. 20560; (DLV) Beneficial Insect Introduction Laboratory, IIBIII, ARS, USDA, Beltsville, Maryland 20705.

Dick Bohart has had a life long love of wasps. While most of us choose other pursuits in our free time, Dick's devotion to his wasps is so intense that they have assumed the status of a hobby with him—he works on them day and night! Few people achieve the broad knowledge and experience in different families of insects possessed by Dick. His work has spanned many aculeate families, and his influence will be felt for many generations to come. The Sphecidae has been one of his favorite groups, and he has published more comprehensive works on this family than any other. We take great pleasure in dedicating our short treatise on *Polemistus* to him.

The cosmopolitan genus *Polemistus* contains 19 described species (Bohart and Menke, 1976). Two of these are poorly known Neotropical species, one of which, the Mexican *pusillus*, was incorrectly reported by Bohart and Menke to occur in the southwestern United States. Our studies of approximately 100 specimens of *Polemistus* from the New World indicate that three species occur in the United States, all of which are undescribed. The three North American species are newly described here, as is a fourth new species discovered in Central America. A key to the six known New World species is provided. Each of us has assumed sole authorship of two of the new species.

Material for this study was borrowed from the following institutions:

Academy of Natural Sciences, Philadelphia (ANSP).
American Entomological Institute, Ann Arbor.
American Museum of Natural History, New York (AMNH).
British Museum (Natural History), London (BMNH).
California Academy of Sciences, San Francisco (CAS).
Cornell University, Ithaca (CUI).
Museum d'Histoire Naturelle, Geneva (Geneva).
National Museum of Natural History, Washington DC (USNM).
Naturhistorisches Museum, Vienna (Vienna).
University of Arizona, Tucson (UA).
University of California, Davis (UCD).

The holotype of *P. yoda* was borrowed from the Mississippi Entomological Museum, Mississippi State University. Richard L. Brown, director, has graciously allowed us to deposit the type in the USNM on indefinite loan. We would also like to thank Norita Chaney, Mike Schauff and Gene Taylor for taking the scanning electron photographs used here.

The New World species of *Polemistus* represent at least two, and possibly three,

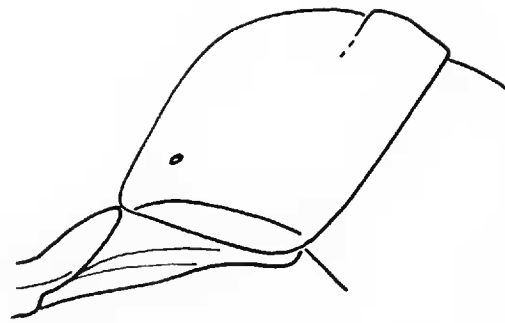
species groups. In the *pusillus* group (*pusillus*, *dickboharti*, *yoda*) the clypeus is densely, evenly covered by appressed silver setae; the clypeal outline, especially in the female, is similar among the species, and there is a narrow malar space in both sexes (Figs. 8–10, 14, 15); a hypersternaulus is usually present (sometimes very short in *yoda*) (Figs. 5, 6); and terga I–II lack a lateral carina, or it is weak. *Polemistus stieglmayri* appears to belong in the *pusillus* group based on clypeal characters, the presence of a hypersternaulus and the setation of the male abdominal venter, but the frontal swellings (Fig. 23), and the strong lateral carina on terga I–II set the species apart. The remaining species, *chewbacca* and *vaderi*, are closely related to the Palearctic species *abnormis* (Kohl). The *abnormis* group is characterized by having a sparsely or non-silvered female clypeus; a large, deep clypeal emargination bounded by large, blunt teeth (Figs. 12, 13) in the female; no malar space in the female and at most a very narrow one in the male; a strong lateral carina on terga I–II; and by the absence of a hypersternaulus (Fig. 7).

In contrast to the ornately sculptured head and thorax of many Old World species, the New World members of *Polemistus* are rather plain, and species characters are few. In the male the presence or absence of antennal tyli and their form, when present, are diagnostic. The presence or absence of long sternal setae on the male abdominal venter is useful. The outline of the free margin of the clypeus can be distinctive in both sexes but unfortunately the mandibles usually have to be spread or the marginal clypeal setae scraped away in order to view this structure. The shape of the labrum is sometimes distinctive. On the scutum the form of the notaulus pits, and the presence or absence of ridges or foveae adjacent to the scutellum are important. Species group characters are used in conjunction with these. Body sculpture and punctation differ little in New World species, and except in *stieglmayri*, we found no apparent differences on the abdomen. Male genitalia were not examined. The known New World species have a slender spine in the scapal basin just above the antennal sockets. Generally in New World species the integument surface has an imbricate microsculpture (sensu Harris, 1979) as seen at 75 \times , and the episternal sulcus, omaulus, hypersternaulus, and notaulus are pitted or foveate (the notaulus sometimes obscurely so). In the New World species the sculpture of the propodeal dorsum is coarse and varies from areolate to rugose to rugulose (Harris, 1979). The sculpture changes to finer, parallel, oblique ridging on the propodeal side.

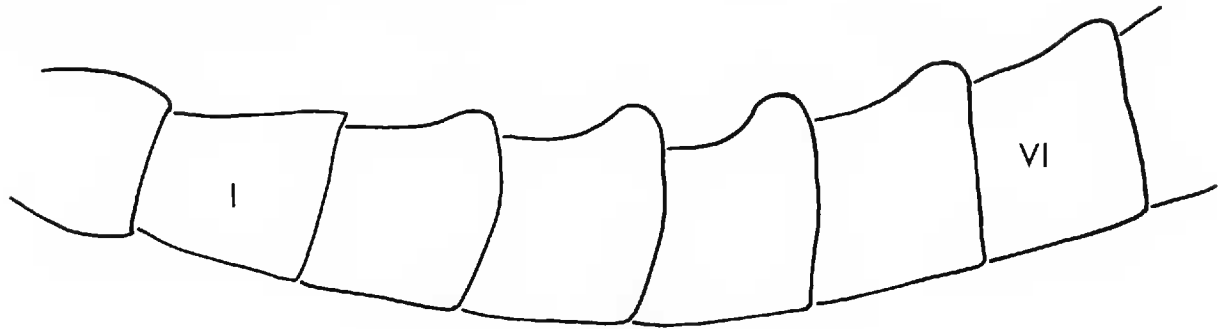
KEY TO NEW WORLD SPECIES OF *POLEMISTUS*

Note: Antennal characters are best seen by using high magnification (75 \times) and good lighting. Male is unknown for *yoda*.

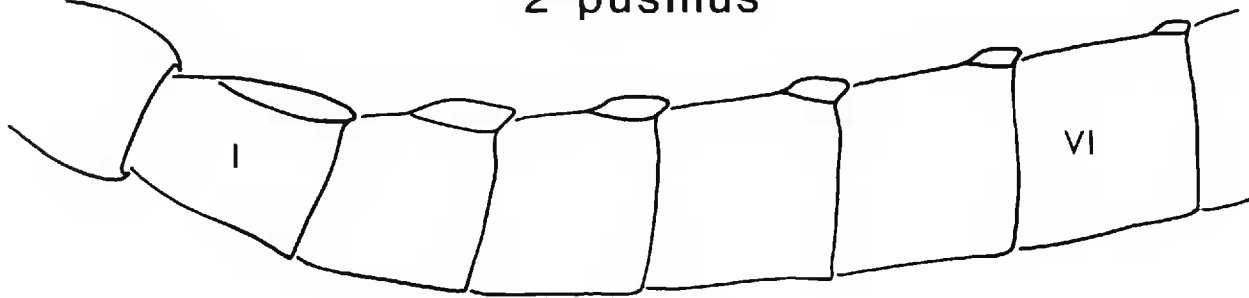
1. Male: Antenna with 13 articles, gaster with 7 visible segments 2
 – Female: Antenna with 12 articles, gaster with 6 visible segments 6
2. Flagellomeres I–VII without projections or ridges ventrally 3
 – Flagellomeres II–IV with projections or ridges ventrally (Figs. 2–4) 4
3. Frons without pair of obliquely transverse swellings at upper margin of scapal basin; pronotal collar without sharp transverse carina; hindmargin of gastral sterna IV–V each with pair of long, separated setae; sw. U.S., nw. Mexico *dickboharti* Menke
 – Frons with pair of obliquely transverse swellings at upper margin of scapal basin (Fig. 23); pronotal collar with sharp transverse carina; hind-



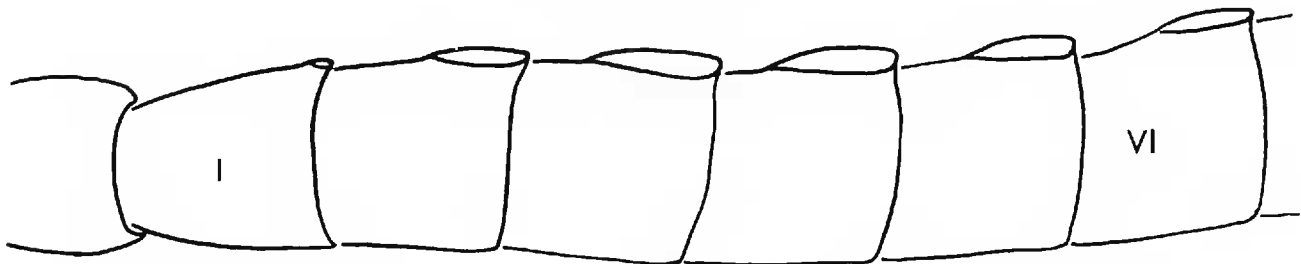
1 stieglmayri



2 pusillus



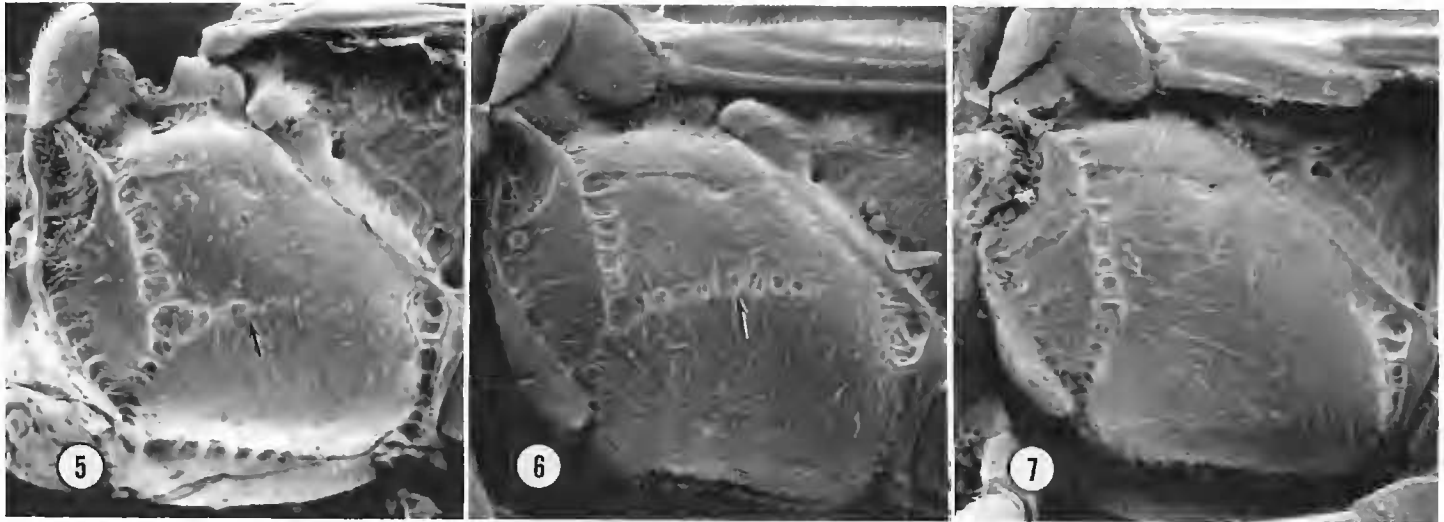
3 vaderi



4 chewbacca

Figs. 1-4. *Polemistus* species. 1, Left profile of female abdominal petiole and first tergum. 2-4, Profile of male flagellomeres I-VI.

- margin of gastral sterna IV-V each with transverse row of long, pale setae; Brasil *stieglmayri* (Kohl)
4. Hypersternaulus present (Fig. 5); flagellomeres II-V (or VI) with rounded projections apicoventrally (Fig. 2); hindmargin of gastral sterna IV-V each with transverse row of long, pale setae; central Mexico
 *pusillus* Saussure
- Hypersternaulus absent (Fig. 7); flagellomeres I-V or II-VI with low ridges ventrally (Figs. 3, 4); sterna IV-V without transverse rows of setae; sw. U.S. 5



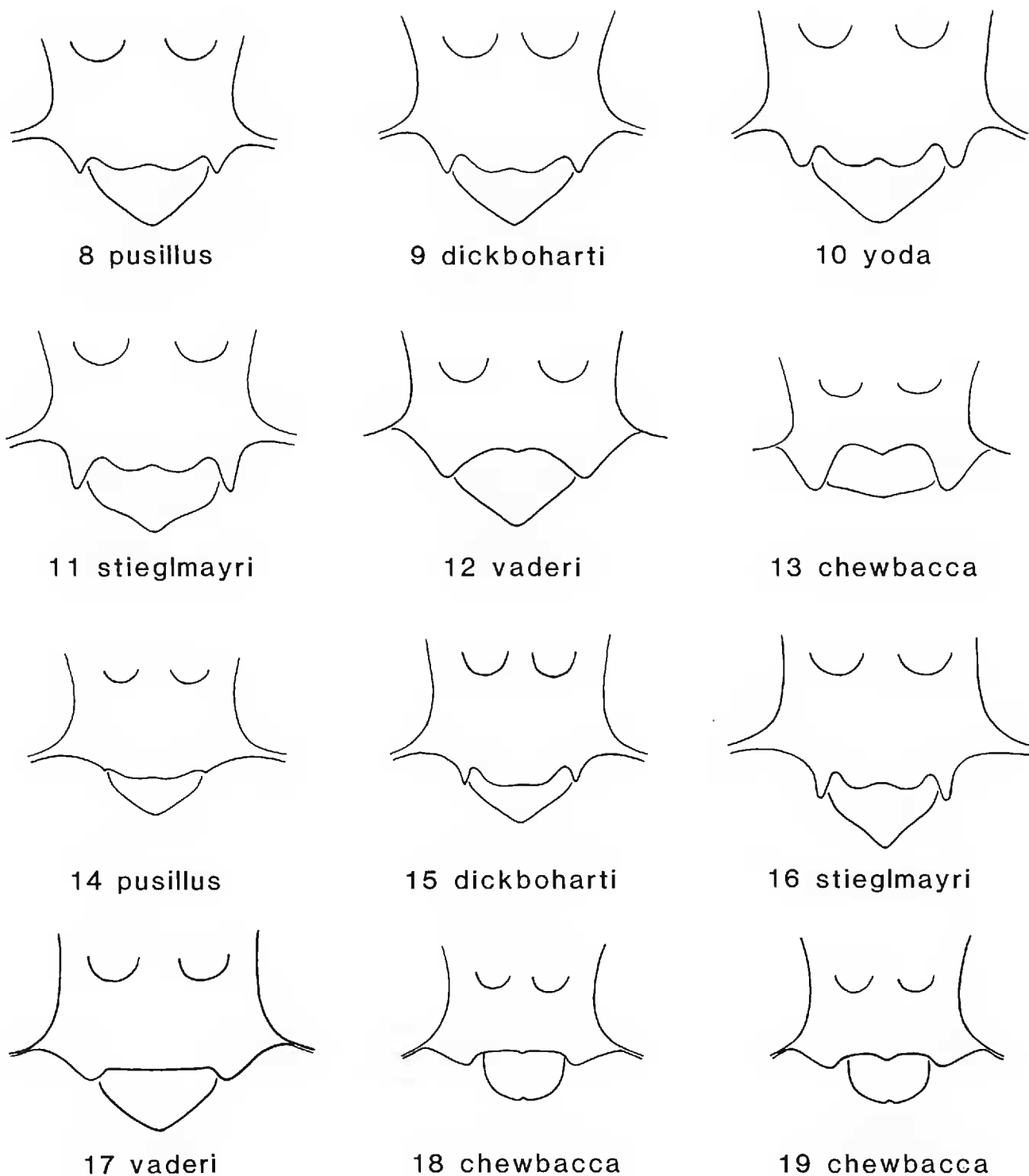
Figs. 5–7. Left mesopleuron of *Polemistus* species, female. 5, *pusillus*. 6, *dickboharti*. 7, *vaderi*.

5. Flagellomere I with long ridge, II–IV or V with progressively shorter ridges (Fig. 3); clypeal outline as in Fig. 17 *vaderi* Vincent
- Flagellomere I at most with weak apical process, II–VI with long, prominent ridges (Fig. 4); clypeal outline as in Figs. 18, 19 . . . *chewbacca* Menke
6. Hypersternaulus absent (Fig. 7); clypeus arcuately uni- or bi-emarginate (Figs. 12, 13), its surface with few silver setae only near apex 7
- Hypersternaulus present as row of large pits (Fig. 6) (if weak, following clypeal characters diagnostic); clypeus sinuately emarginate (Figs. 8–11), its surface uniformly, moderately covered by appressed silver setae . . . 8
7. Labrum triangular apically (Fig. 12); clypeal outline as in Fig. 12; Utah, Ariz., New Mexico *vaderi* Vincent
- Labrum truncate apically (Fig. 13); clypeal outline as in Fig. 13; se. Ariz. *chewbacca* Menke
8. Notaulus ending posterad in large circular depression whose diameter equals that of hindocellus (Fig. 20), depression usually sharply rimmed cephalad when viewed from rear; central Mexico *pusillus* Saussure
- Notaulus not ending posterad in large circular depression, or if so, it is vague and no more than $\frac{2}{3}$ diameter of hindocellus (Figs. 21, 22) 9
9. Frons with pair of obliquely transverse swellings at upper margin of scapal basin (Fig. 23); middle lobe of clypeus exceeded by lateral teeth (Fig. 11); Brasil *stieglmayri* (Kohl)
- Frons without swellings at upper margin of scapal basin; middle lobe of clypeus on line drawn between lateral teeth (Figs. 9, 10) 10
10. Scutal surface next to scutellum with short, longitudinal or oblique rugulae (Fig. 21); hypersternaulus often extending posterad beyond level of scrobe, pits of hypersternaulus well defined (Fig. 6); sw. U.S., nw. Mexico *dickboharti* Menke
- Scutal surface without rugulae posteriorly; hypersternaulus not extending beyond level of scrobe, often shorter, pits of hypersternaulus becoming indistinct posterad; El Salvador, Honduras, Nicaragua *yoda* Vincent

***Polemistus pusillus* Saussure**

(Figs. 2, 5, 8, 14, 20)

Polemistus pusillus Saussure, 1892:567. Holotype male, “Mexico calida (Cor-



Figs. 8-19. Clypeal and labral outlines of *Polemistus* species. 8-13, Females. 14-19, Males (19 is holotype).

doaba)" (Geneva). Bohart and Menke, 1976:185 (listed). *Passaloecus pusillus*, Rau, 1943:648 (biology).

Diagnosis.—The sawtooth-like projections of the tyli on male flagellomeres II-V or VI (Fig. 2), and the large, deep last notaular pit (diameter equal to hindocellus) in the female (Fig. 20) are diagnostic for *pusillus*. The anterior side of the last notaular pit usually is sharply margined by a ridge which may extend sinuately between both notauli. A number of parallel microridges usually precede it. The bottom of the last pit is smooth and polished. Males also have the large notaular pit but sometimes it is smaller than the hindocellus.

The labrum is triangular in *pusillus*. It and the clypeus are shown in Figs. 8, 14. The scutum is unridged posteriorly except in one female where three weak rugulae can be seen. The hypersternaulus extends posterad to the level of the scrobe in males, slightly beyond in females (ends about half way to mesopleural

pit, Fig. 5). Terga I and II lack a lateral carina. In the male sterna IV–V have transverse rows of long, whitish setae posteromedially which stand out against the short vestiture of the rest of the venter.

Saussure identified his type as a female, but it is a male and the abdomen is now missing.

Distribution.—This species is known only from central Mexico. Records of *pusillus* from the United States (Bohart and Menke, 1976:185; Krombein, 1979:1606) are based on misidentified material of *dickboharti*.

Material studied.—MEXICO, Guerrero, Acapulco, 1939–40, biological note #2480, P. Rau, 2 ♀, 2 ♂ (USNM). Jalisco, Guadalajara, July 21, McClendon, 1 ♂ (ANSP). Morelos, Cuernavaca, 5500', May 22, June 18, 1959, H. E. and M. A. Evans, 2 ♀ (CUI); 5 mi. e. Cuernavaca, March 29, 1962, F. D. Parker, 1 ♀ (UCD). Vera Cruz, Cordoba, type ♂ (Geneva).

Biology.—Rau (1943) found *pusillus* nesting in vacant mud cells of a *Trypoxylon* species. Each cell was provisioned with 6–8 aphids of the genera *Aphis* and *Macrosiphum*, and the entrance to the nest was sealed with a "transparent, glasslike substance." Some cells were partitioned with the same material. Chrysidid cleptoparasites of the genera *Omalus* and *Chrysis*, and a torymid parasitoid of the genus *Monodontomerus* were found in some *pusillus* cells.

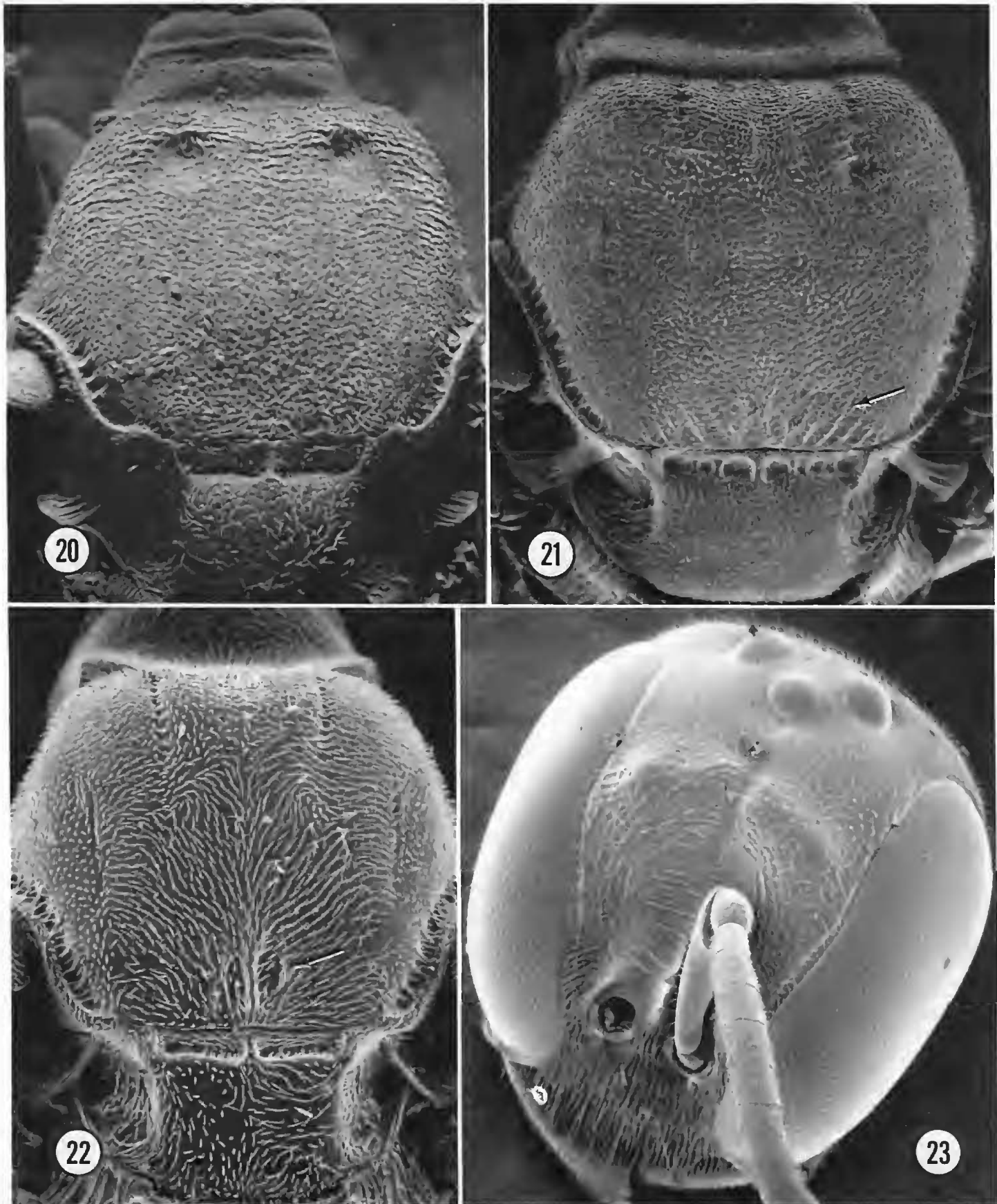
***Polemistus dickboharti* Menke, NEW SPECIES**
(Figs. 6, 9, 15, 21)

Holotype male.—Black except as follows: pale yellow: palpi, tegula; brownish yellow: ventral surface of scape, pedicel and basal flagellomeres; fore and midlegs except coxae and posterior surface of midfemur; hindtrochanter, basal half of hindtibia, hindtarsus. Tegula brown.

Clypeus and lower frons densely covered with appressed silver setae which obscure surface. Sterna IV–V each bearing a pair of separated, long, erect setae on posterior margin.

Scapal basin crossed by many fine, irregular ridges, the lower of which curve downward laterally; frons above scapal basin finely punctate (75×), punctures 2–3 diameters apart; inner orbit paralleled by crenulate carina opposite scapal basin; upper two thirds of outer orbit with similar non-crenulate carina; flagellomeres without tyli ventrally; free edge of clypeus with lateral tooth, weakly bilobate mesally (Fig. 15); labrum triangular apically (Fig. 15). Scutum densely micro-punctate (75×), punctures separated by less than puncture diameter, scutum with longitudinal rugulae next to scutellum which are oblique laterally (similar to Fig. 21); last pit of notaulus largest, its diameter approximately equal to one half diameter of hindocellus; hypersternaulus extending posterad nearly to mesopleural pit; scrobal sulcus represented by horizontal crest between scrobe and episternal sulcus. Terga I–II without lateral carina. Length 4.5 mm.

Variation in males.—The fore and midfemora are sometimes suffused with brown except at their apices. The tegula varies from brown to translucent yellow. The last notaular pit varies in size. It may be no larger than the other pits, and in one specimen it is as large as a hindocellus. The pleuron between the scrobal sulcus and hypersternaulus sometimes is polished and lacks microsculpture. In



Figs. 20-23. *Polemistus* species. 20-22, Dorsal view of female scutum and scutellum. 20, *pusillus*; 21, *dickboharti*; 22, *stieglmayri*. 23, Face of *stieglmayri* showing transverse swellings below ocelli.

the single male from California, the carina along the inner orbit is not crenulate, and the scutum does not have rugulae at its posterior border.

Female.—As in male except: labrum and mandible brownish, flagellum usually dark brown except for pale venter of flagellomeres I-II. Tegula translucent yellow. Occasionally all legs yellow, but usually hind leg brownish except for trochanter and base of tibia.

Clypeus and lower frons moderately, uniformly covered with appressed silver

setae, surface partially obscured; clypeal outline as in Fig. 9. Last pit of notaulus usually about same size as others, but not exceeding two thirds diameter of hindocellus; scutum lacks rugulae posteriorly in specimen from Aduana, Mexico; hypersternaulus extends posterad two thirds to three fourths distance to mesopleural pit (Fig. 6). Length 4–5 mm.

Discussion.—This species is similar to *pusillus*. Females have the same clypeal outline, but the very large last pit of the notaulus (equal to diameter of hindocellus) in *pusillus* (Fig. 20) contrasts with the smaller last pit in *dickboharti* (no more than two thirds diameter of hindocellus and often much smaller, Fig. 21). Also females of *dickboharti* nearly always have rugulae along the hind margin of the scutum (Fig. 21). In most *pusillus* females (and those of *yoda* also) the scutum is plain posteriorly. Males of *dickboharti* separate easily from those of *pusillus* on the basis of the simple flagellomeres. The basal flagellomeres in *pusillus* males have prominent, sawtooth-like tyli ventrally (Fig. 2). The lateral tooth of the male clypeus is much larger in *dickboharti* (Fig. 15) than in *pusillus* (Fig. 14). Males of *dickboharti* lack the transverse rows of long setae found in males of *pusillus*; instead there are two long, separated setae on sternum IV–V.

Etymology.—With great affection I dedicate this species to Dick Bohart, a dear friend, colleague, and mentor.

Distribution.—Arizona, southern Utah, southern California, and Sonora, Mexico.

Types.—Holotype ♂: ARIZONA, *Cochise Co.*, Portal, 5000', Sept. 5, 1959, H. E. Evans (CUI). Fifteen ♂, 22 ♀ paratypes as follows: ARIZONA, *Cochise Co.*, same place as type, on honey dew on walnut, Sept. 2–12, 1959, H. E. Evans, 4 ♂ (CUI); 1 mi. ne. Portal, on walnut, Sept. 7, 1959, J. R. Powers, 1 ♀ (CAS); 3 mi. ne. Portal, on Agave, July 22, 1964, G. D. Butler, 1 ♀ (UCD); Southwest Research Station, 5400', 5 mi. w. Portal, on honey dew on *Populus*, Aug. 3–Sept. 12, 1959, H. E. Evans, 9 ♂, 2 ♀ (CUI); same place, July 3–13, 1963, J. Rozen, D. Oliver, A. Moldenke, J. Woods, 5 ♀ (AMNH, UCD); same place, July 11–14, 1965, V. Roth, 2 ♀ (AMNH, UCD); Huachuca Mtns., June 26, 1940, R. A. Flock, 1 ♀ (UCD); Miller Canyon, 6000', 1 mi. w. parking area, July 16, 1964, M. Noller, 1 ♂ (UCD). *Graham Co.*, 0.9 mi. along road to Marijilda Canyon from highway 666, 3860', Aug. 3, 1965, H. B. Leech, 1 ♀ (CAS). *Gila Co.*, 3 mi. sw. Christmas, June 5, 1962, malaise trap by *Condalia*, F. Werner, 1 ♀ (UCD). *Navajo Co.*, Carrizo, June 21, 1957, Butler and Werner, 1 ♀ (UCD). *Pima Co.*, Tucson, April 14, 1940, R. H. Crandall, 1 ♀ (UCD); 27 mi. se. Tucson, May 29, 1965, M. E. Irwin, 1 ♀ (UCD); Sabino Canyon, Santa Catalina Mtns., May 11, 1961, R. and E. Painter, 1 ♀ (UCD). *Santa Cruz Co.*, Patagonia, on *Cessia leptocarpa*, July 29, 1962, M. Noller, P. Johnson, 1 ♀ (UCD); Canelo, Aug. 3, 1956, G. Butler, 1 ♂ (UCD). UTAH, *Garfield Co.*, Bryce Canyon, June 18, 1947, G. Bohart, 1 ♀ (UCD). *Washington Co.*, St. George, June 15, 1930, E. W. Davis, 1 ♀ (USNM). MEXICO, *Sonora*, Nogales, 1 ♀ (BMNH).

The following nonparatypic material has been seen: ARIZONA: *Cochise Co.*, Douglas, Sept. 19, 1933, W. W. Jones, 1 ♀ (USNM); Southwest Research Station, 5 mi. w. Portal, 5400', Sept. 16, 1963, V. Roth, 1 ♀ (AMNH). CALIFORNIA, *San Diego Co.*, Palm Canyon, Borego, May 3, 1945, A. Melander, 1 ♂ (USNM). MEXICO, *Sonora*, Aduana, March 15, 1962, L. Stange, 1 ♀ (UCD).

Polemistus yoda Vincent, NEW SPECIES

(Fig. 10)

Holotype female.—Black except as follows: yellow: scape ventrally, mandible (apex brownish), palpi, pronotal lobe; yellow brown: labrum, ventral surface of pedicel and flagellum (last few flagellomeres darker), foreleg (except outer surface of tibia yellow), midleg (except femur black with extreme apex brownish), hind-trochanter and tarsus; hindtibial base yellow. Tegula translucent yellow anteriorly, dark brown posteriorly.

Clypeus, lower frons, propleuron posteriorly and forecoxa ventrally densely covered by appressed silver setae which obscure surface.

Scapal basin irregularly, finely cross carinulate; frons above scapal basin finely punctate (75 \times), punctures 1-2 diameters apart; inner orbit closely paralleled by fine carina opposite scapal basin, upper two thirds of outer orbit with similar carina; clypeal outline as in Fig. 10; labrum triangular apically (Fig. 10). Scutum densely micropunctate (75 \times), punctures separated by less than puncture diameter; notaulus pits sharply formed, uniform in width; hypersternaulus ending posterad at level of scrobe, pits of hypersternaulus smaller, shallower than those of episternal sulcus; scrobal sulcus represented by horizontal crest between scrobe and episternal sulcus. Terga I-II with weak lateral carina. Length 4.5 mm.

Male.—Unknown.

Variation in female.—The hypersternaulus is weakly indicated in both paratypes. It does not reach the level of the scrobe and only the first pit is large and clearly formed.

Discussion.—Females of *P. yoda* are most similar to those of *dickboharti*, but the ridging along the posterior margin of the scutum in the latter (Fig. 21) contrasts with the plain scutum of the former. *Polemistus yoda* has weak lateral carinae on terga I-II, but these are absent in *dickboharti* and *pusillus*. Also these last two species lack the dense appressed silver setae found on the propleuron and forecoxa of *yoda*.

Etymology.—The name *yoda*, a noun in apposition, is based on a character in the movie "The Empire Strikes Back."

Distribution.—El Salvador, Honduras, and Nicaragua.

Types.—Holotype ♀: NICARAGUA, 14 km. sw. Camoapa, swept from doorway *Gossypium hirsutum*, Dec. 1, 1976, W. H. Cross (USNM). Two ♀ paratypes as follows: HONDURAS, Tegucigalpa, June 12, 1918, F. J. Dyer (USNM). EL SALVADOR, 2 and one half mi. w. Quezaltepeque, July 12, 1961, M. E. Irwin (UCD).

Polemistus stieglmayri (Kohl)

(Figs. 1, 11, 16, 22, 23)

Passaloecus stieglmayri Kohl, 1905:359. Holotype female, "Brasilien (Rio Grande do Sul)" (Vienna). Kohl, 1905:529 (listed). *Polemistus stieglmayri*, Bohart and Menke, 1976:185 (listed).

Diagnosis.—The pair of oblique swellings on the frons above the scapal basin are unique to *stieglmayri* (Fig. 23). The absence of tyli on the male flagellum and the long clypeal teeth (Figs. 11, 16) are also distinctive. The labrum is triangular

apically. In both sexes the scutum usually has a pair of longitudinally elongate foveae posteromedially which are narrowly separated by a septum (Fig. 22). In some specimens these two foveae are broad, roughly triangular depressions which fade laterally and may contain rugulae. The notaulus pits are uniform in size. The hypersternaulus extends posterad to or just beyond the level of the scrobe. Terga I and II have a lateral carina. Tergum I sometimes has a strong transverse subapical impression which, when viewed in lateral profile, results in a humped outline (Fig. 1). This impression is quite weak in two thirds of the specimens at hand. The posterior margin of sterna IV–V in males of *stieglmayri* bear transverse rows of long, pale setae, a feature shared with *pusillus*.

Distribution.—Known only from southern Brasil.

Material examined.—BRASIL, *Rio Grande do Sul*, no specific locality, Stieglmayr, ♀ type (Vienna). *Santa Catarina*, Nova Teutonia, Nov.–Feb. 1964–65, Fritz Plaumann, 8 ♀, 1 ♂ (UCD).

Polemistus vaderi Vincent, NEW SPECIES

(Figs. 3, 7, 12, 17)

Holotype male.—Black except as follows: pale yellow: scape and pedicel ventrally, palpi, pronotal lobe, tegula, fore and midtibiae and tarsi, basal half of hindtibia; brownish yellow: fore and midtrochanter ventrally and hindtrochanter; closing face of fore and midfemora yellow, brown above; hindtarsi brownish.

Clypeus and lower frons densely covered by appressed silver setae which obscure surface.

Scapal basin crossed by many fine, irregular ridges which curve downward laterally; frons above scapal basin finely punctate (75×), punctures 2–3 diameters apart; inner orbit closely paralleled by fine carina opposite scapal basin; upper two thirds of outer orbit with similar carina; flagellomeres I–IV with low ridgelike tyli ventrally, those on I–II extending the length of each flagellomere, those on III–IV shorter, occupying apical one half and one third, respectively (similar to Fig. 3); free edge of clypeus as in Fig. 17; labrum roundly triangular apically (Fig. 17). Scutum densely micropunctate (75×), punctures separated by less than puncture diameter; notaulus pits shallow, ill defined laterad; propodeal side with many fine, parallel, oblique ridges which reach metapleural sulcus; scrobal sulcus represented by horizontal crest between scrobe and episternal sulcus; hypersternaulus absent although episternal sulcus pits enlarged at that level of pleuron. Terga I–II with lateral carina. Length 4.5 mm.

Variation in males.—In some specimens the fore and midlegs are entirely yellow except the coxae, and the basal flagellomeres are yellowish beneath. Tyli occur on the first six flagellomeres in some specimens, but those on III–VI are represented by very short apical tooth-like elevations. The tylus on flagellomere II sometimes is restricted to the apical two thirds or one half of the article (Fig. 3). The notauli are sometimes weakly impressed and the pitting obscure.

Female.—As in male except: mandible apex, labrum, and fore and midtrochanters brownish black; forefemur brownish black except yellow on apical one fourth; midfemur yellow only at extreme apex. Clypeus with few appressed silver setae near apex, surface not obscured; appressed silver setae on frons between eye and scapal basin only partially obscure surface; scapal basin shining, without ridges; frons between scapal basin and eye with feeble, vertical microridges; carina

along inner orbit short, weak; outer orbit without such carina; free edge of clypeus with large, deep, semicircular emargination containing a weak central tooth (Fig. 12); clypeal surface shining, broadly concave; labrum triangular apically. Length 4.5-6 mm.

Discussion.—The broad, deep, semicircular clypeal emargination and triangular labrum of the female (Fig. 12), and the presence of a long tylus on the first male flagellomere (Fig. 3) are diagnostic for *vaderi*. The absence of a hypersternaulus (Fig. 7) and the absence in the female of dense silver clypeal setae relate *vaderi* to *chewbacca*, but the latter has a truncate labrum in the female (Fig. 13), and flagellomere I has at most a short apical tylus in the male (Fig. 4). The clypeal outlines also differ between these species (compare Figs. 12, 13).

Etymology.—This species is named after Darth Vader, a character in the movies "Star Wars" and "The Empire Strikes Back."

Distribution.—Utah, Arizona and New Mexico.

Types.—Holotype ♂: UTAH, *Beaver Co.*, Beaver Mountain, 6000-7000', rearing code BM 6-B, Aug. 1972, D. Vincent (USNM). Seven ♂ and 3 ♀ paratypes as follows: ARIZONA, *Cochise Co.*, Southwest Research Station, 5 mi. w. Portal, 5400', July 8, 1963, J. Rozen, D. Oliver, A. Moldenke & J. Woods, 1 ♀ (AMNH); same location, Aug. 29, 1959, H. E. Evans, 1 ♂ (CUI); same location, Sept. 13, 1959, on honey dew on *Populus*, H. E. Evans, 1 ♂ (CUI). NEW MEXICO, *Lincoln Co.*, Capitan Mountains, May 26, 1907, ex galleries of *Dendroctonus convexifrons*, Hopkins #5470b, J. L. Webb, 1 ♂ (USNM); *San Miguel Co.*, 5 mi. nw. Las Vegas, reared from galls of *Andricus ruginosus* Bassett, April 29, 1918, Hopkins #15602, L. H. Weld, 3 ♂ (USNM). UTAH, same data as holotype, rearing codes BM 6-C, BM 5-B, BM 3-B, 1 ♂, 2 ♀ (USNM).

Biology.—Four trap nests from the holotype locality were examined. The nests were constructed in 2.0 × 32.0 mm trap-nest borings in soft pine blocks. The trap-nest blocks were placed at the site in June 1972 and recovered in August 1972. Partitions and closures ranged from 0.5 to 2.0 mm thick and were made of pale yellow translucent resin. Three nests contained one brood cell each, and one nest contained two brood cells. Brood cells ranged from 12.0 to 20.0 mm long. Each nest had a single vestibular cell which ranged in length from 6.0 to 15.5 mm. Four of the five developing larvae spun a single, vestigial cocoon consisting of a delicate, transverse, silken partition immediately anterior to the larva's head. The larva of the female from the same nest as the holotype spun two of these silken partitions a few millimeters apart. Fecal pellets were deposited at the rear of each brood cell. Aphids were the prey but the number used per cell could not be determined.

Polemistus chewbacca Menke, NEW SPECIES

(Figs. 4, 13, 18, 19)

Holotype male.—Black except as follows: yellow: ventral surface of antenna (yellow changes to brownish yellow toward apex), trochanters ventrally, apex of fore and midfemora, fore and midtibiae, basal half of hindtibia, all tarsi; pale yellow: palpi, pronotal lobe and tegula.

Clypeus and lower frons densely covered by appressed silver setae which obscure surface.

Scapal basin nearly smooth, with scattered, weak, fine, transverse ridges; ex-

tremely fine scattered punctures visible (75 \times) on frons below ocelli, punctures 2–3 diameters apart; no carina paralleling inner or outer orbits; flagellomere I with weak toothlike tylus apicoventrally, flagellomeres II–VI with low ridgelike tyli ventrally, that on II visible only on apical one fourth, those on III–V extending length of each flagellomere, that of VI occupying outer three fourths of flagellomere (Fig. 4); free edge of clypeus as in Fig. 18; labrum arcuate apically, weakly indented medially (Fig. 18). Scutum with extremely fine punctures anteriorly (75 \times), punctures 1–2 diameters apart; notaulus weakly impressed, not clearly pitted; propodeal side smooth, shining adjacent to metapleuron but changing to oblique parallel ridging and areolation dorsad; scrobal sulcus represented by crest between scrobe and episternal sulcus; hypersternaulus absent. Terga I–II with lateral carina, but carina on I weak. Length 4.5 mm.

Variation in male.—The antennal tyli occupy only the apical one half to three fourths of flagellomeres II–VI in one specimen, the apical three fourths on V–VI in three specimens, and in one of these last the tyli on II–IV are full length. In one specimen the propodeal side is ridged to the metapleuron and the dorsum is broadly rugose. The angle at the center of the clypeal notch is more prominent in the paratypes (Fig. 19).

Female.—As in male except: mandible apex and labrum brownish, trochanters sometimes completely yellow. Clypeus with few appressed silver setae near apex, surface not obscured. Free edge of clypeus deeply bi-emarginate, its lateral lobes reflexed (Fig. 13); clypeal surface shiny; labrum truncate (Fig. 13); scutal punctation obscure at 75 \times . Terga I–II with strong lateral carina. Length 4.5–5 mm.

Discussion.—The bi-emarginate female clypeus (Fig. 13), the rounded male labrum, and the absence of a long tylus on male flagellomere I (Fig. 4) are diagnostic for *chewbacca*. The absence of a hypersternaulus and the sparsely silvered female clypeus relate *chewbacca* to *vaderi*, but the latter has a semicircular clypeal emargination in the female (Fig. 12), the labrum is triangular in the female (Fig. 12), and flagellomere I has a long tylus in the male (Fig. 3). The male clypeal and labral outlines also differ between these two species (compare Figs. 17–19).

Etymology.—The name *chewbacca*, a noun in apposition, is based on a rather wild looking but friendly beast in the movies “Star Wars” and “The Empire Strikes Back.”

Distribution.—Southeastern Arizona.

Types.—Holotype δ : ARIZONA, Cochise Co., Southwest Research Station, 5 mi. w. Portal, 5400', Sept. 9, 1959, H. E. Evans (CUI). Four δ and 3 η paratypes as follows: ARIZONA, same locality as type, Aug. 20, 23, 29, Sept. 9, 13, 1959 (one on honey dew on *Populus*), H. E. Evans, 2 δ , 3 η (CUI); Huachuca Mts., 5000', June 14, 1920, A. A. Nichol, 1 η (USNM); Miller Canyon, 6000', 1 mi. w. parking area, Huachuca Mts., July 16, 1964, M. Noller, 1 δ (UA).

LITERATURE CITED

- Bohart, R. M., and A. S. Menke. 1976. Sphecid wasps of the world. Univ. Calif. Press, Berkeley, ix + 695 pp.
- Harris, R. A. 1979. A glossary of surface sculpturing. Occ. Papers Ent., Calif. Dept. Food Agric., no. 28, 31 pp.
- Kohl, F. F. 1905. Hymenopteren aus der neotropischen Fauna. Verhandl. zool.-bot. Ges. Wien 55: 338–366.

- . 1905. Zur Kenntnis der Hymenopterengattung *Passaloecus* Shuck. Verhandl. zool.-bot. Ges. Wien 55:517-529.
- Krombein, K. V. 1979. Superfamily Sphecoidea, pp. 1573-1740. In: Krombein *et al.*, Catalog of Hymenoptera in America north of Mexico, vol. 2. Smithsonian Institution Press, Washington DC.
- Rau, P. 1943. The nesting habits of certain sphecid wasps of Mexico, with notes on their parasites. Ann. Ent. Soc. Amer. 36:647-653.
- Saussure, H. de. 1892. Histoire naturelle des Hymenopteres, pp. 177-590 in vol. 20. In: Grandidier, Histoire physique, naturelle, et politique de Madagascar. Paris.